

CLAIMS

I claim:

1. A method of simulating simultaneous receipt of a plurality of channels of data over a network using a bandwidth
5 less than that needed to simultaneously receive said plurality of channels, said method comprising the steps of:

receiving samples of data from each of said channels,
said samples comprising less than all of said data comprising
each of said channels;

10 storing said samples in a memory; and
when a user selects one of said channels for use, reading
out a sample of data corresponding to said selected channel
from said memory.

15 2. A method as set forth in claim 1 further comprising
the step of:

at or before the end of said sample is read out from said
memory, commencing receipt of full data corresponding to said
selected channel.

20 3. A method as set forth in claim 2 further comprising
the step of:

at or before the end of said sample is read out of said
memory, transmitting to a source of said selected channel a
request to receive said full data on said channel.

4. A method as set forth in claim 1 further comprising the step of:

receiving data on at least one of said channels in full.

5. A method as set forth in claim 3 wherein said data on each of said channels comprises data that, when received in full mode, would be received at a particular time and wherein said step of receiving said samples comprises receiving samples bearing time stamps indicating the time to which they correspond if received in full mode.

6. A method as set forth in claim 5 wherein said storing step further comprises storing said time stamps associated with said samples and information indicative of the channel to which said sample corresponds.

7. A method as set forth in claim 6 wherein said step of reading out further comprises:

selecting for reading out from said stored samples a sample corresponding to said selected channel having a time stamp most closely corresponding to a current time.

8. A method of simulating simultaneous receipt at a television of a plurality of television channels of data over a network using a bandwidth less than that needed to simultaneously receive said plurality of channels, said method comprising the steps of:

(1) receiving the full data for at least one of said television channels;

(2) transmitting said full data for one of said television channels to said television;

5 (3) receiving samples of data from each other of said television channels, said samples comprising less than all of said data comprising each of said television channels;

(4) storing said samples in a memory; and

(5) when a new one of said television channels is selected for viewing at said television, reading out a sample of data corresponding to said newly selected television channel from said memory.

9. A method as set forth in claim 8 further comprising the steps of:

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15 (6) at or before the end of said sample is read out of said memory, transmitting to a source of said accessed channel a request to receive said full data on said selected channel; and

20 (7) at or before the end of said sample is read out from said memory, commencing receipt of full data on said selected channel.

10. A method as set forth in claim 9 wherein step (7) further comprises ceasing receipt of said previously selected channel in full mode.

11. A method as set forth in claim 9 wherein steps (6) and (7) are performed only when said channel remains selected for a predetermined amount of time.

12. A method as set forth in claim 11 wherein said
5 predetermined amount of time is less than a duration of said sample.

13. A method as set forth in claim 12 wherein said
predetermined amount of time is an amount of time sufficiently
smaller than the duration of said sample for steps (6) and (7)
10 to be performed before the end of said sample.

14. A method as set forth in claim 9 wherein said data
on each of said channels comprises data that, when received in
full mode, would be received at a particular time and wherein
said step of receiving said samples comprises receiving
15 samples bearing time stamps indicating the time to which they
correspond if received in full mode.

15. A method as set forth in claim 14 wherein said
storing step comprises storing multiple samples per channel,
including said time stamps associated with said samples and
20 information indicative of the channel to which said sample
corresponds.

16. A method as set forth in claim 15 wherein said step
of reading out further comprises:

selecting for reading out from said stored samples a sample corresponding to said selected channel having a time stamp most closely corresponding to a current time.

17. A method as set forth in claim 16 wherein said
5 samples are samples corresponding to times that are after the present time.

18. A method as set forth in claim 17 further comprising the step of:

marking samples as stale when said time stamp of said sample is earlier than the present time and wherein a sample may be overwritten when it has been marked stale.

19. A method as set forth in claim 9 wherein said samples comprise data that would be transmitted in full mode for the corresponding channel at the time the sample is taken.

20. A method as set forth in claim 19 wherein a stored
15 sample corresponding to each channel is overwritten each time a new sample corresponding said channel is received.

21. A method as set forth in claim 8 wherein said samples are of a lower resolution than the full channel data.

22. A method as set forth in claim 8 further comprising
20 the steps of:

responsive to a request from said television, reading out a plurality of samples, each sample corresponding to a different one of said channels;

displaying said samples simultaneously on different
5 portions of said television.

23. A method of simulating simultaneous transmission of a plurality of channels of data over a network using a bandwidth less than that needed to simultaneously transmit said plurality of channels, said method comprising the steps
10 of:

transmitting data corresponding to one of said channels in full to a receiver, the particular channel being transmitted in full being responsive to a selection signal received from said receiver; and

transmitting samples of data from each of said channels
15 to a receiver for storage by said receiver, said samples comprising less than all of said data comprising each of said channels.

24. A method as set forth in claim 23 further comprising
20 the step of:

receiving from said receiver, a request to receive full data for a selected channel; and

wherein said transmitting in full step comprises transmitting said full data for said selected channel.

25. A method as set forth in claim 23 wherein said step of transmitting said samples further comprises the steps of:

transmitting time stamps corresponding to said samples indicating the time to which they would be transmitted in full mode; and

transmitting information indicative of the channel to which each of said samples corresponds.

26. A method as set forth in claim 23 wherein said channels comprises television program data.

27. A method as set forth in claim 26 wherein data corresponding to a channel is transmitted in full only when a channel remains selected for a predetermined amount of time.

28. A method as set forth in claim 27 wherein said samples are samples corresponding to times that are after the present time.

29. A method as set forth in claim 26 wherein said samples comprise the data that would be transmitted in full mode for the corresponding channel at the time the sample is transmitted.

30. A method as set forth in claim 26 wherein said samples are of a lower resolution than the full channel data.

31. A method of simulating simultaneous receipt of a plurality of channels of data at a node of a communications network using a bandwidth less than that needed to simultaneously receive said plurality of channels comprising:

5 transmitting from a source to said node samples of data from each of said channels, said samples comprising less than all of said data comprising each of said channels;

storing said samples in a memory associated with said node; and

10 when a user of said node selects one of said channels, reading out a sample of data corresponding to said accessed channel from said memory.

32. A method as set forth in claim 31 further comprising the steps of:

15 a predetermined period after said user selects said one channel, transmitting from said node a selection signal indicating the selected channel;

responsive to said selection signal, transmitting from said source to said node full data for said selected channel.

20 33. A method as set forth in claim 32 wherein said source transmits to said node the full data corresponding to at least one channel to said node while using at least a portion of remaining bandwidth to transmit said samples to said node.

34. A method as set forth in claim 33 further comprising the step of forwarding said data corresponding to said full channel to a television for display.

5 35. A method as set forth in claim 34 wherein said data on each of said channels comprises data that, when transmitted in full mode, would be transmitted at a particular time and wherein said step of transmitting said samples comprises transmitting samples bearing time stamps indicating the time to which they correspond if received in full mode.

10 36. A method as set forth in claim 35 wherein said storing step further comprises storing said time stamps associated with said samples and information indicative of the channel to which said sample corresponds.

15 37. A method as set forth in claim 36 wherein said step of reading out further comprises:

selecting for reading out from said stored samples a sample corresponding to said accessed channel having a time stamp most closely corresponding to a current time.

20 38. A method as set forth in claim 34 wherein said channels comprise television data.

39. A method as set forth in claim 38 further comprising the step of:

prioritizing said plurality of channels.

40. A method as set forth in claim 39:

wherein said prioritizing step comprises determining the amount of time users at said node watch each of said plurality of channels; and

5 wherein said transmitting and storing steps comprise transmitting and storing more sample data for those channels that are watched more often.

41. A method as set forth in claim 40 wherein samples are transmitted and stored more frequently for those channels that are watched more often.

42. A method as set forth in claim 40 wherein samples corresponding to channels that are watched more often are longer than samples corresponding to channels that are watched less often.

43. A method as set forth in claim 40 wherein said determining step comprises determining the amount of time that each channel is transmitted in full to said node.

44. A method as set forth in claim 40 wherein said determining step is performed at said source.

20 45. A method as set forth in claim 34 wherein said predetermined amount of time is less than a duration of said sample.

46. A method as set forth in claim 37 wherein said storing step comprises storing multiple samples per channel, including said time stamps associated with said samples and information indicative of the channel to which said sample corresponds.

47. A method as set forth in claim 46 wherein said samples are samples corresponding to times that are after the present time.

48. A method as set forth in claim 47 further comprising the step of:

marking samples as stale when said time stamp of said sample is earlier than the present time and wherein a sample may be overwritten when it has been marked stale.

49. A method as set forth in claim 37 wherein said samples comprise the data that would be transmitted in full mode for the corresponding channel at the time the sample is taken.

50. A method as set forth in claim 49 wherein a stored sample corresponding to each channel is overwritten each time a new sample corresponding said channel is taken.

51. A method as set forth in claim 34 wherein said samples are of a lower resolution than full channel data.

52. A method as set forth in claim 34 further comprising the steps of:

responsive to a request from said television, reading out a plurality of samples, each sample corresponding to a different one of said channels;

displaying said samples simultaneously on different portions of said television.

53. A communications network for simulating simultaneous transmission from a source to a node of a plurality of channels of data using a bandwidth less than that needed to simultaneously transmit said plurality of channels comprising:

a source for transmitting data over said network, said data comprising a plurality of channels of data;

at least one node for receiving data from said source;

a processor associated with said source, said processor programmed to transmit at least one channel of data in full to said at least one node said and to transmit samples of data corresponding to said plurality of channels to said node;

a memory associated with said node for storing said samples;

a processor associated with said node, said processor programmed to send data on said channel that is being received in full to a display device and to send said samples to said memory for storage and, responsive to a user selecting a channel for forwarding to said display device, reading out a sample of data corresponding to said selected channel from said memory.

54. A communications network as set forth in claim 53 wherein said processor associated with said node is further programmed to transmit to said source a request for full data transmission for said selected channel before the end of said sample is read out from said memory; and

wherein said processor associated with said source is further programmed to transmit said at least one channel of data in full to said at least node responsive to said request.

55. A communications network as set forth in claim 54 wherein said data comprises television program data.

56. A communications network as set forth in claim 55 wherein said processor associated with said node is further programmed to receive a request identifying a channel for display and, responsive thereto, to read out from said memory said stored sample corresponding to said requested channel.

57. A communications network as set forth in claim 56 wherein said processor associated with said node is further programmed to transmit to said source a request to receive said full data for said channel requested for display a predetermined period of time before the end of said sample is read out of said memory and said processor associated with said source is further programmed to switch the at least one channel that is being transmitted in full responsive to said request.

58. A communications network as set forth in claim 57 wherein said data on each of said channels comprises data that, when received in full mode, would be received at a particular time and wherein said samples further comprise time stamps indicating the time to which they correspond if received in full mode and information disclosing the channel to which said data corresponds.

59. A communications network as set forth in claim 58 wherein said memory stores multiple samples per channel simultaneously and, when a user first requests a channel for display, said processor associated with said node is further programmed to read out from said memory said stored sample corresponding to said accessed channel having a time stamp most closely corresponding to a current time.

60. A communications network as set forth in claim 59 wherein said stored samples comprise samples corresponding to times that are after the present time.

61. A communications network as set forth in claim 60 wherein said processor associated with said node is further programmed to mark stored samples as stale when said time stamp of said sample is earlier than the present time and wherein a sample may be overwritten when it has been marked stale.

62. A communications network as set forth in claim 55 wherein said samples comprise the data that would be transmitted in full mode for the corresponding channel at the time the sample is transmitted.

5 63. A communications network as set forth in claim 62 wherein said processor associated with said node is further programmed to overwrite a stored sample corresponding to each channel each time a new sample corresponding said channel is transmitted.

10 64. A communications network as set forth in claim 53 wherein said samples are of a lower resolution than full channel data.

15 65. A communications network as set forth in claim 53 wherein, responsive to a request, said processor associated with said node is further programmed to read out a plurality of samples, each sample corresponding to a different one of said channels, for simultaneous display on said display device.

20 66. A transceiver for simulating simultaneous transmission from said transceiver to another transceiver via a communications network a plurality of channels of data using a bandwidth less than that needed to simultaneously transmit said plurality of channels, said transceiver comprising:
 a source of a plurality of channels of data;

a transmitter;

a receiver;

a processor programmed to transmit via said transmitter full data for at least one of said plurality of channels to another transceiver coupled to said network responsive to data received via said receiver from said other transceiver identifying said at least one channel;

said processor further programmed to transmit samples of data corresponding to at least said plurality of channels other than said channel transmitted in full.

67. A transceiver as set forth in claim 66 wherein said processor transmits samples of data corresponding to all of said plurality of channels.

68. A transceiver as set forth in claim 66 wherein said processor is further programmed to transmit along with said samples data indicating the particular channel to which said samples correspond.

69. A transceiver as set forth in claim 66 wherein said data comprises television program data.

70. A transceiver as set forth in claim 69 wherein said data on each of said channels comprises data that, when received in full mode, would be received at a particular time and wherein said samples further comprise time stamps

indicating the time to which they would correspond if received in full mode.

71. A transceiver as set forth in claim 70 wherein said samples comprise samples corresponding to times that are after the present time.

72. A transceiver as set forth in claim 66 wherein said samples are of a lower resolution than full channel data.

73. A transciever for simulating simultaneous receipt from another transceiver via a communications network a plurality of channels of data using a bandwidth less than that needed to simultaneously transmit said plurality of channels, said transceiver comprising:

a transmitter;

a receiver;

a memory;

a processor programmed to transmit, via said transmitter, to another transciever coupled to said network a request to receive at least one channel of data in full, said other transciever having data for a plurality of channels that may be transmitted in full or in samples;

said processor further programmed to receive, via said receiver, said channel transmitted in full and said samples;

said processor further programmed to store said samples in said memory.

74. A transciever as set forth in claim 73 wherein said processor is further programmed to transmit data from said channel received in full to an output device.

5 75. A transciever as set forth in claim 74 wherein said data comprises television program data.

76. A transceiver as set forth in claim 75 wherein said output device is a monitor.

77. A transciever as set forth in claim 76 wherein said data comprises television program data and wherein said monitor is a television.

10 78. A transceiver as set forth in claim 77 wherein said processor is further programmed to receive a request identifying a channel for display and, responsive thereto, to read out from said memory said stored sample corresponding to
15 said requested channel.

20 79. A transceiver as set forth in claim 78 wherein said processor is further programmed to transmit to said other transceiver a request to receive full data for said channel requested for display a predetermined period of time before the end of said sample is read out of said memory.

80. A transceiver as set forth in claim 79 wherein said data for each of said channels comprises data that, when

received in full mode, would be received at a particular time and wherein said samples further comprise time stamps indicating the time to which they correspond if received in full mode and information disclosing the channel to which said data corresponds.

81. A transceiver as set forth in claim 80 wherein multiple samples per channel are stored in said memory simultaneously and, when a request for a channel for display is made, said processor is further programmed to read out from said memory a stored sample corresponding to said accessed channel and having a time stamp most closely corresponding to a current time.

82. A communications network as set forth in claim 73 wherein said stored samples comprise samples corresponding to times that are after the present time.

83. A transceiver as set forth in claim 80 wherein said processor is further programmed to mark stored samples as stale when said time stamp of said sample is earlier than the present time and wherein a sample may be overwritten when it has been marked stale.

84. A transceiver as set forth in claim 74 wherein said samples comprise the data that would be transmitted in full mode for the corresponding channel at the time the sample is transmitted.

85. A transceiver as set forth in claim 84 wherein said processor is further programmed to overwrite a stored sample corresponding to each channel each time a new sample corresponding said channel is transmitted.

5 86. A transceiver as set forth in claim 75 wherein said
samples are of a lower resolution than full channel data.

87. A communications network as set forth in claim 75 wherein, responsive to a request, said processor is further programmed to read out a plurality of samples, each sample corresponding to a different one of said channels, for simultaneous display on said display device.